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ART. VI. — *The Trees of America*. By R. U. PIPER, M. D.
Boston. 1857. Nos. 1, 2.

THERE are some topics which claim periodical notice in the pages of an American quarterly. Not the least important of these is the subject of "American Forest-Trees." In dealing with this subject, our Review has already proved itself faithful, and within a quarter of a century has furnished at least four elaborate essays on this fertile theme. The time is fully accomplished for a return to it. Nine interstitial years have brought it to our perihelion, and the attraction to it is made stronger by the welcome intrusion of the new work which Dr. Piper announces. We are glad of the occasion to say a few words which ought, in due course, to be said at this time. The subject, indeed, does not lack discussion. Agricultural newspapers and reports, the circulars of nursery owners, and frequent articles in the daily journals, all keep the matter sufficiently before the public; yet the few solid treatises that have been published have already become scarce. The translation of Michaux's great work, indifferent and imperfect as it was, has quite disappeared. Browne's "*Sylva Americana*" has passed out of circulation; and his larger work, on the "*Trees of America*," which never reached, we believe, its second volume, is hardly known by name to learned librarians. Nuttall's valuable supplement to Michaux, a most curious monument of persevering zeal and enterprise, is now exceedingly rare. Even the comparatively recent Report of Mr. Emerson on the "*Trees and Shrubs of Massachusetts*" is not to be had at the bookstores. The text-books of medical and scientific botany deal only incidentally with the subject.

A new general work on the "*Trees of America*," therefore, comes to us fresh, and as a sort of surprise. The plan of Dr. Piper's publication, as stated in his prospectus, if less exact than that of previous works, is more comprehensive and attractive. His book is intended to be popular and entertaining, rather than scientific, — a book of engravings, with a running practical commentary. The text will be a frame for the pictures, and a pleasant filling up of the intervening

spaces, — partly description, partly suggestion, partly historical and critical observation; not by any means, however, for this reason inferior in value to the pictures. Dr. Piper's pictorial illustrations differ from those of other writers of his class in being copies of individual trees, rather than of genera or species. He gives, not merely the likeness of an oak, but of the "Assabet Oak" and the "Charter Oak"; not merely the likeness of an elm, but of the "Avery Elm" in Stratham, and the "Elm on Boston Common"; likenesses not merely of such trees as grow in America, but of famous trees which actually exist in America, and may so be taken as types of their species. These are the several heads of a discourse on the general subject of trees, which is addressed alike to the farmer, the landscape-gardener, and the gentleman owner, — to boards of health, railway corporations, and all friends of improvement.

Of Dr. Piper's qualifications for the bold and large task which he has undertaken, we can only say that he has the eye of an artist, the hand of a draughtsman, and the spirit of an enthusiast. His knowledge of trees and their habits is ample, his experience in their management has been equally long and successful, and his love for them amounts to a passion. The labor of preparing such a work is far too slow for his swift desire, yet he will do his task no faster than he can do it well. At the date of our writing, two numbers of the work have been issued, which, as specimen numbers, give a most favorable prophecy of what is to come. Each number contains four engravings and sixteen pages of letter-press, in quarto form, electrotyped on paper as thick as parchment, with wide spaces and ample margin. A more beautiful and fitting dress has been given to no American book. The nicer mechanical labor has been performed by the author, who can etch as skillfully as he sketches, and will intrust his more delicate work to no unpractised hand. The book is not sufficiently advanced to enable us to judge fairly of its literary merits. We can say with safety, nevertheless, that it will be always earnest, always clear, and never dry. The fault which we have most to fear is a redundancy of quotation, by which Dr. Piper's modesty seeks needlessly to justify and fortify his own opin-

ions. His own authority is competent, without such help. The work is to be published in quarterly parts, at a subscription price of two dollars a year. We are glad to learn that already a considerable number of subscribers have recorded their names; and we are permitted to add that, by the liberality of a distinguished cultivator and gentleman, Mr. Frederic Tudor, the continuance of the enterprise is guaranteed. It is a labor of love on the part of the author, who asks no profit for himself; but we venture to bespeak for him the assistance of all whose tastes and whose means allow them to become subscribers. We commend especially to close inspection the admirable drawing of the "ash forest" in Maine, which makes the frontispiece to the second number, in which immense difficulties of detail and of light and shade are so beautifully mastered, and which, to our eyes, no photograph could surpass. We have seen other delineations of Dr. Piper, both in surgical anatomy and in natural scenery, which were remarkable, but nothing quite equal to this view. The drawing of the great Winchester Pine-tree is also wonderfully perfect. In the progress of the work, it is intended to include all those trees in this country which have, by their size, their age, their peculiarities, or their associations, any especial claim to notice. In most instances, the engravings will be from sketches taken directly from the tree by Dr. Piper. Occasionally, as in the case of the giant Redwood-tree in California, the sketch must be copied from the work of another hand. The number of parts to which the work will extend, will depend on the health of the author. If his design is carried out, not less than twenty will appear.

This Review,* we think, was one of the first to utter a warning against the wanton waste of our beautiful forests. Already, in a single generation, the good fruits of the reactionary movement are visible, and some of the cleared tracts are clothed anew with woods which the hand of man has planted. The desolation which threatened whole sections of our country has been partially arrested; the Ohio farmer has restored what his father destroyed; and in the new lands of the West there are estates which resemble the parks and

* October, 1832.

groves of England. In this Eastern region, where the waste was less notable, the decrease has, unfortunately, gone on more rapidly. To the consumption of timber in house-building and ship-building have been added the insatiable demands of railroads, — the voracity of the iron horse, whose throat is for the forests an open sepulchre. Thirty years ago, the State of Maine was described as “a dense wilderness.” Now, it is possible to ride for miles in its interior without the protection of any grateful shade. The coast line of Massachusetts is not now marked, as the Pilgrims beheld it, by the sombre edging of uniform woods; but the rim of the horizon is divided by numerous clefts and vistas, through which the voyager sees the setting sun. The hills around Salem are almost as bare as the hills around Jerusalem; and there is more than one interval, blank as the Roman Campagna, where the names of the early settlers were once perpetuated in the forests which they owned. “Brown’s Woods” is most likely nothing but a pasture, diversified by a few straggling apple-trees; and half a dozen oaks perpetuate the memory of “Clark’s Grove.” Thousands of acres of woodland have been burned over within the last dozen years, kindled by sparks from the locomotive; and the spectacle which was presented in 1830 on the banks of the Miami, is repeated in 1850 along the Merri-mac. Accident and avarice are doing for the old lands of the East what the settler’s necessities seemed to compel in the new lands of the West.

It is curious, too, to note the changes in taste and sentiment, as marked in the disappearance of various sorts of trees. Gone are those stately lines of Lombardy poplars which once stiffly fringed our roadways, or stood sentinels before our aristocratic mansions; and the satirist of bachelors must seek some other type for his caustic comparison. Gone are those “Balms of Gilead” which softened the light by their polished leaves, and loaded the air with their spicy perfume, above many a New England farm-house. The gudewife no longer points to her “shoemake” (as the sumach-tree was formerly called), with its crimson clusters, the pride of her trim front garden. The great sycamores have fallen before the economical wrath of a people who cannot pardon such obstinate

reluctance to throw off an unexplained disease. Sentimental willows now weep mostly in ancient prints, where forlorn youths with pink faces bend above leaning gravestones: they are rejected from parks and door-yards. It is as difficult now to get in Boston a handful of locust-blossoms as a handful of orange-blossoms, and the flowets of the lilac are as rare in our cities as flowers of the pomegranate. Where in New England are the blushing peach-orchards which once encircled beds of peas and parsley? Where are the wild vines, once trained to festoon the walls and to garland the oak? The fashion has changed. New claimants have supplanted the former favorites; and rustic Tityrus now, instead of practising his woodland lay under a spreading beech-tree, reads the last French novel under the shade of his veranda, and in the odor of an "ailanthus."

If anything could provoke a saint to wrath, it is the frequent destruction of fine trees on the most frivolous pretences. Here a majestic elm is sacrificed because the dripping from its boughs moistens cheap shingles on some adjoining house, and compels a more speedy repair. There a barn is to be removed, and all the trees which stand in the line of its direct course must give way. A couple of rowdies, returning on a dark night from a winter revel, are upset against an oak which projects into the road a foot or two; straightway the sapient selectmen of the town debate the case, and solemnly order that the tree which has stood there since the memory of man shall be brought low, rather than a dollar shall be spent to widen the road at that point. Here, again, unfortunately, a new street must be laid out in a straight line, to satisfy the precise genius of modern engineering; and the great tree that stops the way must disappear, root and branch, rather than a hair's-breadth be changed in the beautiful lithograph of attractive house-lots. The first care of a lucky broker, who has bought at a bargain some fine old estate, is to thin out and trim the trees and shrubbery on the model of his own ledger, saving only the specimens which he can coax into regular rows, or inspect with half-shut eye. We know more than one instance where a quarrel between neighbors has led to the destruction of noble trees, simply because one thought

that he might annoy the other by depriving him of his shade. And there are not a few occasions to admire that thrift which cuts down an orchard because birds get all the cherries, or boys and Irishmen steal all the apples.

Provocation of this sort, which constantly vexes one in a large country town, suggests the question, whether he who removes a public ornament and good, even from his own land, is not as much a subject for the law as he who creates a public nuisance. The destruction of half a dozen fine shade-trees may be as great an injury to a neighborhood as the erection of an oil-boiler or a fish-house. Yet the one has an impunity not allowed to the other. Many statutes are passed with much less moral justification than a statute to prevent the arbitrary cutting down of valuable trees. When estates are sold, there ought to be in the deeds a restraining clause,—an entail for the trees which border the road, if not for those which surround the house. The tastes of the city exchange ought not to have unchecked license in the groves of the suburbs. At any rate, a legislative “resolution” on this subject would be quite as timely and sensible as most of the resolutions which are passed by legislative bodies.

But there is also reason for fault-finding in the style and taste which prevail in planting trees, as well as in the vandalism which destroys them. Almost every one who owns a house must garnish it with a larger or a smaller number of trees, and the paint is scarcely dry upon the clapboards before ominous earth-works in the garden prophesy of future shade. But the chances are that all these cavities will be occupied by trees of a single kind, elm, maple, or possibly linden, or that the utmost variety will be of two species. Our amateur planters are as reluctant to mingle sorts of trees as a toper is to mix his liquors. Straight lines, too, are the ruling law of average landscape planting; the passion for curves is exceptional; the genuine Yankee wants the shortest passage from his door to the roadway, and tolerates no angles in his well-adjusted boundary. In four gardens out of five the rows of trees are perfectly straight, and in the fifth the curves are such as Nature would never have made, and in which the trees will get no healthy growth. Comparatively few, we imagine, in

setting out trees, order their position with reference to winds, to mutual protection, or to harmony with surrounding objects. And the man who has twice and thrice seen the elms which he placed unguarded along his northern fence wilt and die, will continue to insert others in their places, marvelling at his strange ill-luck, when he has taken such pains with them.

There is something to be blamed, then, in the constructive method, as well as in the destructive method, of dealing with trees. We chronicle gratefully the annual multiplication of tree-planting societies, whose works are made manifest along our city streets, and the bolder advocacy, year by year, of allowing our pasture and ploughed land to return to its original forest state. But the tree reform is yet in its earlier stage, and is hindered by very numerous and obstinate prejudices. It is still hard to convince a farmer that he would do well to let his corn-field become a wood, or to bring the shade of an elm above his young orchards, or to surround his house with dampness and darkness in the form of a grove. To the force of many reasons for planting trees he is quite insensible. He does not, for instance, at all understand why trees should be planted for the sake of their associations, or how he can do as much for his children by rearing oaks on his land as by hoarding his money in the bank. He may melt a little at his daughter's touching performance of Mr. Morris's elegiac entreaty to the woodman; but it is a passing weakness, and will not affect his general purpose to plant, if he plants at all, for profit and not for posterity. Your Yankee would hand down his name in connection with some enterprise or invention, some patent plough or patent churn or patent apple-parer, not in connection with laurels and oaks, like Daphne and the Druids. Yet there are some who will appreciate even this sentimental reason for planting trees. Any father will recognize it as a beautiful and easy way of commemorating the birth of children in his household. The members of a college class, revisiting the place of their early instruction, will see in the tree which they left there on their parting-day a permanent memorial of their former union. Travel strengthens the force of this reason. When we discover how wide and high and sacred are the memories which

are kept on earth by means of these signs, — when we have visited the churchyard at Stoke, with its “rugged yew-trees,” where Gray lies buried, or the “Burnham beeches,” where he used to ramble; when we have looked upon the oak at Penshurst, which marks the birth-time of Philip Sidney, or that huge tree at Grafton, where, nearly four centuries ago, Edward Plantagenet first met the Lady Elizabeth Woodville; when we have rested under “Milton’s mulberry” in Christ Church Garden, and remembered Warton under the “Avon willows”; when we have walked in that square of the silent Certosa, where the spray of the fountain still moistens the great cypress which Michael Angelo planted, or have lingered by that blasted trunk beneath whose shelter, when its boughs were green, poor Tasso was wont to look down over the Eternal City, and to dream and sigh his life away, — when we have found everywhere the most famous sites and events, in the history of war and genius and religion, from the massacre at Clisson to the victory at Marathon, from the spot in Cambridge where Washington met the American army to the spot in Bristol where Augustine held conference with the English bishops, or that most ancient place of meeting on the plains of Mamre, which holds the tradition of Abraham and the angels, scenes of faith and valor and romance, fixed and perpetuated by these lords of the forest, — we come to understand better this sentimental reason, which some esteem so lightly.

This sort of association, indeed, cannot generally be planned and provided for. The best associations come by chance, and no man can say when he plants a tree that it is destined hereafter to be joined in memory with any great thing. Yet many a man in his old age feels a deeper attachment to the home where he has always dwelt, because it is overhung by the boughs of the tree which, as a sapling, he put there in his boyhood. The house has gone to decay, it may be, and he must build a better. But the trees make the place so dear, that he cannot let it pass from his possession, and his children will keep it because their father’s trees are there. In these days of change and uneasiness, such bonds to one’s native soil are most important and effective. Old

furniture, family portraits, even the buried bones of ancestors, may go with the children in their restless migrations; but the venerable trees cannot be carried off. To part with these often costs the hardest struggle, when, to repair his broken fortunes, one must sell his paternal acres and remove to a new home far away. All feel that it is a sort of sacrilege to destroy a tree which has been consecrated by any noble association. Every patriot felt the insult, when the British troops in Boston cut down and burned for fuel the "Liberty tree"; and all Connecticut lamented as a public calamity the fall of the Charter Oak.

The æsthetic reason for tree-planting is certainly more generally acknowledged than the sentimental reason. The most unsophisticated eye, and the most cultivated, alike recognize the beauty of this kind of ornament. A Western pioneer and an *habitué* of the Bois de Boulogne hold the same opinion in regard to the general grace of great trees, differing only in regard to details. Every farmer in Lancaster, Massachusetts, rejoices in the majestic elms which make the glory of his village, as much as that refined foreigner who could not resist their fascination, and who fixed his home, as he has found his grave, beneath their spreading branches. A Brookline schoolboy feels the grace of an avenue of lime-trees as truly as an artist who luxuriates in the magnificence of the "Mall" of Utrecht, or forgets the wife of Napoleon in the enchantment of the entrance to her chateau at Meudon. This sense of the beauty of trees is anterior to teaching, and resists quite vigorously the forces which would extirpate it. A Maine lumberman, no doubt, looks with more satisfaction upon his felled log than upon the trunk which he must spare; the crash of its fall is more delightful than the rustling of its leaves in the upper air; yet no man is a better demonstrator of beauty in the outline and the growth of trees than this same lumberman. John Ruskin could not discourse more eloquently about an Alpine precipice, than this dweller in the forest about the tall pine, which whistles and whispers above his winter home.

This sense of the beauty of trees is often, indeed, very crude, and modified by very fantastic notions. We know a man, for instance, who can see no beauty in a tree which

is not symmetrical, and who is accustomed to cut off from his trees any limb, however large, when an accident has destroyed the corresponding limb. In this way he has gradually trimmed a spreading horsechestnut, wounded by the missiles of boys, till it now resembles an Egyptian palm, only a long stem with a feathery tuft at the top. We know another man who abhors trees with pinnate leaves, and so rejects from his estate every kind of locust and evergreen. We have already alluded to that perverted fancy which sees in the ragged poplars only types of extreme ugliness. Not a few are amazed that any man of taste can admire the *white birch*, that mean straggler along the roadside. One whose idea of beauty is squareness and uprightness, will be offended by any tree which leans out of its perpendicular. The Connecticut pedler was true to the characteristic neatness of his native State when he wondered, looking upon the live-oaks of Georgia, garnished with their long pendants of gray moss, "why the people didn't *scrape* their trees." Parasites and fungous growths are often enough to destroy all the beauty of trees to the eye of a gardener; a hornet's or caterpillar's nest changes grace to deformity; and the elm-branches become "horrid" when they drop by invisible threads the disgusting canker-worms. On the other hand, to some eyes the beauty of trees is improved by artificial appendages. Some white-wash the trunks for the sake of ornament; and the bill-sticker in a New England village finds the monarch of the public square completely noble, only when it bears upon every front the charming announcement of a sheriff's sale, a caucus, and a monster caravan.

This consideration of ornament is, fortunately, closely joined to the broader consideration of profit, to which, of course, all will listen. Here art and interest are nearly identical, and taste will prove, in the language of the shrewd Jew planter of Bethlehem, "remunerative." It can be demonstrated that the best use for the larger part of the cleared land of New England would be to plant forests upon it. There is, except in the rich gardens close around the cities, no land so profitable, no land which pays so good an interest on its cost, as woodland. In some parts of Massachusetts a man who owns a

hundred acres of pasture is little better than a bankrupt, while he who owns a hundred acres of forest is independently rich. The first must pay taxes on what does not pay for its culture, while the second can cut off enough to meet the annual interest, yet have more at the end than at the beginning. We once heard an eccentric genius maintain that his wood-land, about fifty acres in all, though he had bought it, and paid for it a good round sum, some thirty years before, had in reality never cost him a cent; "for," said he, "I have cut off wood enough to pay not only the original outlay, but to meet all the worth of the money at compound interest, and to cover all charges, and now I have more wood than I found there at the beginning." It was a rational logic enough.

We are confident, that, at the present prices of timber and fuel, the profits of wood-land to our New England farmers are at least three times as great as the profits of the land which they cultivate with so much labor. The experiment of planting locusts on Long Island has proved that lands, before considered valueless, may become the most precious possession of their owners. Thousands of acres now lying waste might, with a very small outlay, be made to yield very great returns. The length of time that must pass before the profit of these artificial forests can be tested, undoubtedly deters many from planting them. Very few men like to make an investment of which the returns begin to come only after twenty or thirty years. But every man knows that whatever raises the value of his land is as sure profit as that which actually puts cash into his pocket. There seems to be less promise in an acre of young locusts than in an acre of thriving turnips; but in twenty years the value of all the annual turnips will not begin to reach the value of the trees. The longer the planter is willing to wait, the greater will be his ratio of gain. The early age at which trees are felled precludes a fair test of the superior profit of this kind of planting over corn-planting. Patience is a cardinal virtue, when we are dealing with forests.

There should be on every farm of reasonable size an annual planting, as well as annual cutting, of trees. Most farmers consider it a duty to spend a portion of the year in this latter

exercise, and if they do not begin quite so early as Hesiod advises, —

Τῆμος ἀδηκτοτάτῃ πέλεται τμηθεῖσα σιδήρῳ
 ὕλῃ, φύλλα θ' ἔραξε χέει, πτόρθοιο τε λήγει ;
 Τῆμος ἄρ' ὕλοτομῶν μεμνημένος ὥρια ἔργα, —

at least with the first days of winter they shoulder their axes, and make the woods ring with their brisk strokes. The ambition of a good wood-chopper is equal to that of a good rifle-shooter, and he who can cut and pile his eight cords "between daylight and dark" has a fame like the marksman who can split his ball at a hundred yards. Without the stimulus of an Agricultural Society's prize, it ought to be considered a point of honor to plant at least as many trees as are cut down, — to keep the number at least full. As your shrewd fisherman takes care to put a second net across the river before the first is drawn out, so that no fish shall escape, so your shrewd farmer, while he draws his piles from one side of his wood off to the brick-yard, ought to know that a new forest is growing up on the other side, to be ready for him when he penetrates so far.

We shall not undertake to say what kinds of wood will yield the speediest and the largest profit, whether the oak, the pine, the cedar, or the locust. Any of these will richly repay the labor and the cost required for their growing. According to the quality of the soil will be the fitness of the tree. The profit of tree-planting, however, cannot be measured by direct pecuniary returns. It affects economy in many ways, aside from the mere growth of the wood. The willow, for instance, a tree of comparatively little commercial value, is of inestimable worth in preserving the land along the banks of streams from the encroachment of the current. Few persons, who have not watched the changes of the banks at the bends of rivers, can have an idea of the damage which is done yearly to our land from this single cause. The land-slides which seem so curious along the Nile, at Manfaloot and Osioot, may be observed on a smaller scale on the Connecticut and the Charles. A double row of osiers is almost a sure protection against this damage. Colonel Colt has planted, it is said, no less than fourteen acres of these trees along the banks

of the Connecticut, and has proved himself in that labor a benefactor alike to the farmers and the basket-makers. The willow in such a situation has a rapid growth, and in a few years a tame and dull stream may be made romantic by the shade which these hedges throw. We know of one river, at least, in New England, which flows through a flat and uninteresting country, yet preserves the fame of beauty, mainly from the foliage along its margin.

Most of our annual crops impoverish the soil. After two or three years of harvest, the grain-field must be left fallow for a season, or be turned to other uses. But trees constantly improve the soil, giving to it more than they draw from it. And they improve not only the soil on which they stand, but the soil all around them. We need not insist upon the annual deposit of decaying leaves or broken boughs, which rot upon the ground, and so infuse into it the elements of new life, but may rather dwell upon one or two of the incidental results which are less considered,—the connection of trees with the proper distribution of snow, and their influence in preventing too rapid evaporation. These topics are of the highest importance.

Snow is proverbially called the "poor man's manure." But to justify this proverb, it must be properly laid and distributed. The Tuscan conceit, "*la neve, per otto di, è madre alla terra, da indi in là è matrigna,*" hardly fits the latitude of New England, and, to be a good mother here, the snow must lend more than a single week of nursing. Two things are necessary to make of the snow an effectual protection to the soil,—that it fall as evenly, and stay as long, as possible. Now both of these requisites are met by the help of trees as they can be met in no other way. By breaking the force of the wind, they prevent not only the drifting of the snow, but its melting also, a fact not so generally remembered. We have seen this remarkably exemplified in the severe storms of the last two winters. Fields that were exposed to the wind were left nearly bare, all the snow being piled up on their farther side against the wall of the roadway in deep drifts, while fields only a few rods off, sheltered from the wind by a wood, were covered by a uniform depth, of a foot or more. Yet

the deep drifts disappeared earlier than the level snow, though the latter was quite as much exposed to the sun. It is not necessary to go into the woods in winter to find the number of inches of snow which have fallen; that can be ascertained as well by gauging the fields which these woods have sheltered.

Nor is it necessary, in order to break the force of the wind, that the trees should be in a forest, or even should be evergreens. Leafless trunks and branches will check the blast as surely as the dark, thick boughs of the pine. Two or three rows of trees, which hardly intercept light at all, will work marvels in intercepting wind. Any one may observe this in his garden, by noticing the effect which even a row of currant-bushes has in keeping quiet the leaves on the ground under their lee. This consideration emphatically appeals to the surveyors of roads and the managers of railways. The immense sums which have been spent in the past winters for opening the avenues of travel might in great part have been saved, if these avenues had been furnished with the easy protection of a couple of rows of trees on either side. It is not in city streets that such a protection is most needed, but in those open and exposed highways which are most neglected. Our tree-planting societies ought not to limit their efforts to the decoration of brick pavements, or the furnishing of shade to traffickers and promenaders. They ought rather to care for those avenues beyond the village, which give growth to the village according to their convenience, as well as beauty according to their ornament. Trees are good and useful within a city; but they are far more useful by the highways which lead to the city. Munich could spare its trees from the streets, content with galleries and churches, but could not spare those majestic ornaments which for miles relieve and glorify the monotonous landscape around it.

On most of our old roads Time has reared, without help from societies or selectmen, a tolerable natural hedge. But that perverse utilitarian fancy which defines a good road as the shortest way from the mill to the market, is annihilating this beneficial work of nature by its sagacious "improvements." To save ten rods of distance in a mile, the old, un-

dulating road, meandering along from house to house, and charming away by its change of lights and vistas the weariness of travel, is converted into a turnpike, hot, dusty, and monotonous as a march across the desert. The bad economy of this change has been severely punished by the round bills for snow-clearing which have recently swelled the taxes of so many of our towns, and the only thing which can make this "improvement" tolerable is a liberal appropriation for the shelter and protection of these straightened roads. No county ought to be allowed to change the course of its public highways without putting the line of the new way in as good a condition as that of the old. And when commissioners decree that the ancient landmarks shall be removed, and the paths of the Pilgrims shall be transposed, so as to radiate from the effulgent circuit of some smart provincial "city," they ought to take thought of the expense and the discomfort, not to speak of the deformity, which their decree involves. One of the first evils which our tree societies are called to remedy is this road-straightening mania.

We read constantly of new inventions and new experiments which seek to diminish the cost of railway working, — changes in valves, boilers, material for fuel, and the like. But we are not aware that any railway in this country has given a first, or even a second, place in its counsels to the planting of trees along its sides as a matter of economy. When such a course has been suggested, it has been supposed that it was only decoration that was thought of. Decoration, though by no means a slight reason for planting trees along railways, is, nevertheless, the least of reasons, if we consider dividends as the foremost need of these useful works. We advise trees along these roads as a remedy, first, for snow-drifts, secondly, for rapid consumption of fuel, and thirdly, for absolute deficiency in fuel. Every locomotive engineer knows where he finds the worst snow-drifts, — where the road is most open and exposed; and it is almost never in the woods. A draught of air, no doubt, is an aid to speed by making steam faster; but where the hours of arrival and departure are regulated, no additional speed is required, and anything which breaks the force of the wind saves the fuel. Every engineer knows how much more

fuel it requires on the open plain than in the woods, to maintain on a windy day the same rate of speed. The most expensive railways in England are not those which run through wooded regions, but those which cross the unsheltered plains; and the heavier grades of shady Derbyshire are more than balanced by the bleak winds on Brighton Downs, where despair, according to Johnson, reaches its climax, and a man cannot even hang himself for want of a tree to hold the rope. No territory can be more exposed to the wind than Belgium and Holland. Yet the railways there, some will plead, are cheaply managed. The seeming objection is a proof of our position, since every one who has travelled in the Low Countries knows how all kinds of avenues, railways, roads, and canals, are adorned and protected. The whole region looks like a great nursery, and the most boisterous winds, sweeping over those infinite lines of trees, are cut and hacked into impalpable fragments. We are confident that, in this matter of the rapid consumption of fuel, the saving from protection against winds on our railways would amount at the end of the year to a considerable item.

It may seem ludicrous to suggest that the few trees which can be grown along the line of a railway will perceptibly supply the deficiency of fuel. Yet a simple mathematical reckoning will show that the suggestion is not a jest, and that the mere thinning out of the growth of twenty years, besides meeting the first cost of the trees, will afford not a small percentage of additional fuel; making a provision, moreover, for accidents and emergencies. More than once during the last winter, locomotives were stopped all night in the snow, where a couple of trees within easy reach would have promptly extricated them. We hold it to be as good policy to have provision for an emergency of this kind, as to establish a special railway telegraph, the expense of which is far greater, yet the economy of which has been decisively tested.

Returning from this digression about railways, we have next to observe that trees perform their chief economical service by preventing too rapid evaporation. It is a common error, that the sun's rays are the first source of evaporation; and many persons ignorantly imagine that, because a locality

is sunny, it is sure to be dry. Now the wind has vastly more to do with drying and evaporation than the sun, as might be shown by an endless variety of facts and illustrations. In the formation of ice on ponds, for instance, as we learn from unquestionable authority, on a windy night, however cold, nothing is actually gained, since the ice wastes by evaporation from the surface as fast as it forms beneath. Every housewife knows that wet linen dries more rapidly when flying in the cold wind, than when hanging quietly in the warm sun. The driving blast which accompanies those sudden showers that vex and drench travellers in mountain regions, brings an almost instant remedy when the shower has passed. Air at rest will take up only a limited quantity of moisture, and is speedily saturated. But air in motion is never satisfied, and is constantly abstracting moisture from the soil. It is not the character of the soil, but the constant and unobstructed motion of the air, which reduces open land to barrenness. Almost anywhere on the desert between Cairo and Gaza, the sterile waste might be turned to greenness simply by being enclosed. It is not wholly true that the palm-trees are in the oases, simply because the springs of water are there. The springs are there because the palm-trees are there beside them. Cut away the palm-trees, and the springs will soon become dry. It is matter of surprise to every one who journeys in Syria or Greece, that the sacred and classic streams should be of such mean dimensions, that Kishon, "that ancient river," should be crossed at a leap, and Ilyssus be spanned by a yardstick. The cause is explained when one considers the hills of these lands, how void they are now of their ancient honors. Why should not Kidron be dry, when the groves have disappeared from the high places of Benjamin? Abana and Pharphar still keep their bounteous flow, for there are forests to stay and hold the snows of Hermon and Libanus; but Cephissus is a brook, since the heights of Phyle are naked. These ancient lands have lost their streams, because they have lost their groves and gardens. And the like cause will everywhere produce the like effect. In an open country, the absolute quantity of water which the rivers discharge is not only less than in a wooded country, but the

flow is incomparably more irregular and unequal. This week the stream may be a foaming torrent, forbidding all passage; next week it will be only a sluggish pool, which scarcely wets your horse's fetlocks. Since our Western lands have been cleared, the alternations in the "stage" of water in the rivers have been much more marked and violent.

The fact has been vexatiously brought home to our practical men by the constant hinderance of the mill-streams from freshets and droughts. Many water-privileges which, half a century ago, were valuable and steady, have now become nearly worthless. The dam which was conveniently put up to saw an adjoining forest into profitable plank, now that its excellent work is done, will drive the saw in the summer no longer. The good riparian mill-owners of one of the ponds in the vicinity of Boston remarked with amazement, some ten years ago, that the supply of water seemed to be failing them, and that the feeding stream had utterly dried up, — a thing never known by the oldest inhabitant. Within a few years the stream has regained its volume, and now flows full, even in the heats of summer. The secret of these changes was, that the water first disappeared on account of the cutting away of the forests about its source, a few miles distant, and returned when the young wood had grown there. Not a few of our larger factories have been compelled to introduce steam-power to supply a deficiency in the volume of water which a few years ago was not troublesome. Indeed, the word "inexhaustible" can now hardly be used of any water-privilege in New England. We do not believe, though some high authorities maintain this view, that the cutting away of forests diminishes the quantity of rain or snow, but we only contend that it deprives the moisture of its beneficent effect upon the earth, by causing it to be too rapidly abstracted, and producing the pernicious alternations of freshet and drought, which are as fatal to the health of the soil as to the health of the men who own the soil.

The last sentence suggests to us a subject of great importance, which we shall not pretend to discuss, but only to open, namely, the sanitary influence of trees and forests. There is a prevalent notion, that too many trees around a house make

it unhealthy, that pestilence lurks where the forest is densest, and that it is hazardous to dwell in the neighborhood of a swamp. Facts, however, do not justify this prejudice. Medical statistics give a verdict in favor of wood-land as against cleared land. The wood-choppers of Maine are far more free from disease than the farmers of Illinois, and scarcely know, in all their exposure, what it is to be cramped by rheumatism or parched by fever. Dismal Swamp is as healthy as Sullivan's Island, and the malaria which hangs along all the Southern seaboard finds no place in that dreadful thicket. Pestilence does not choose those sections of country or those quarters of cities which are greenest, but those which are most bare and open. Dampness is not the source of malaria, but decomposition caused by too rapid drying, whether of vegetable matter or of animal infusoria. Ditches and stagnant pools are, to be sure, not very desirable purifiers of the surrounding air, and generate more serious plagues than their legions of frogs. But a ditch which alternates from wet to dry, or a pool that is weekly emptied and replenished, as wind and shower follow each other, gives forth a much more deadly poison than any ground which is steadily and uniformly saturated with water. Over these waters to-day the poison hangs and lingers, and gives itself to load the breeze to-morrow. In woods, on the contrary, while the decomposition of vegetable and animal matter goes on far more slowly, the poison which is evolved is taken up by the trees themselves, to which it is food and nourishment.

Mr. Timothy Flint, in his account of the Mississippi Valley, mentions the fact, that the wood-cutters on the banks of the streams where the trees had been cut away were constantly attacked by malarious fevers, while such diseases among workmen in the forest were comparatively rare, although the ground on which they worked was quite as moist. Every tree which they left to decay on the ground helped to create the poison, while every tree left standing helped to absorb it. Many cases might be cited where the cutting down of woods has had a most unfavorable effect upon the health of the surrounding region. The Roman Campagna is only a celebrated instance of what is a very common experi-

ence. Every schoolboy is taught how plants purify the atmosphere by removing its excess of carbon, and supplying its defect and waste of oxygen; though this teaching is usually coupled with the cautious proviso, that plants absorb oxygen by night and are therefore unhealthy companions of the chamber. But we have tested it abundantly in travelling, that, when one is properly protected from mosquitos, the night air is most pleasant in the immediate vicinity of woods, more easy to breathe and more softly soporific than even the salt atmosphere of the famed watering-places. A night's sleep is quite as refreshing in the inn at Keswick as in the inn at Brighton, in a North Conway cottage as in a Newport hotel.

There are several reasons why forests affect favorably the health of a locality or neighborhood. Two of these we have already mentioned, that they check the formation of poisonous miasma, and that they absorb it when it is formed, and so prevent its pernicious influence. But their effect upon climate is even more noticeable and unquestionable. They equalize the heat of the atmosphere, and so prevent those extremes which have come in these latter years to be the bane of New England. There can be little doubt that the cutting away of such large tracts of forest in Canada and Maine has had a great share in causing the intense cold of our recent winters, if not in increasing the number of burning days in summer, and that the rapid changes which transpose at the caprice of the winds the place of the months and seasons are due largely to this cause. In a warm day, certainly, one feels the heat more in the woods than on the open prairie, when the wind is blowing. But a thermometer will give a lower temperature in the former than in the latter position. A fair way to test the difference is to sit for a while in a boat upon a pond surrounded by woods, and then to go into the woods. The sensation will instantly be one of refreshing coolness. In winter, on the contrary, the thermometer shows a much higher temperature in the woods than in the open field, with a wider variation in proportion as the external cold is greater. Teamsters know this, and even on a still day in January feel a relief from the cold, the moment they reach the protecting woods.

We are not able to give the results of any large observation of the comparative temperature in wooded and in open countries. Unfortunately, the foresters omit to provide themselves with the means of measuring heat, and are content with the sensation of comfort and the satisfaction of profit. Experiments enough have been made on a small scale to prove that, if the mean temperature is about the same in cleared land as in forest, the extremes in the latter are much less severe and the variations much less rapid. That the wood of living trees gives off heat directly in winter there can be no doubt, and there can be as little doubt that the atmospheric heat in summer is taken up by branches and foliage. Of course the influence of trees in deflecting and softening the rays of the sun has much to do with this equalizing process; and the first reason which a child would give why the woods should be more comfortable than the open field, is one which needs not be weakened by any refinements of science. Shade is a hygienic agent not less genuine than light; and Nature approves that song of the comforts of behemoth, "chief of the ways of God, who lieth under the shady trees, in the covert of the reed," as heartily as she sympathizes with the desperate prayer of Ajax.

The effect of forests in establishing an electrical equilibrium, and in conducting the electric fluid or force, has also a bearing upon their sanitary value. Many persons object to the neighborhood of a grove, for fear of the lightning, and tall trees, when a charged cloud envelops them in its blackness, are terrible to those who else would love them. Yet we maintain that there is more real security in a house provided with a surrounding of these natural conductors, than in the best fitting of any patent metallic points. A grove of trees does on a grand scale what Orcutt's rods do on a very small scale. However this may be, the electric condition of the atmosphere is more healthy, when there are these efficient means of adjusting it; there is a freer play of the lungs, an easier movement in the limbs, and the air is less oppressive on a sultry day.

These general views, however, will not apply to all kinds and varieties of trees. There are special influences which

modify the general verdict of salubrity. Some kinds of trees are certainly as pernicious in their exhalations as others in their substance and qualities. One may be poisoned by odors as surely as by touch and taste. Even the most delicious perfumes become nauseous and sickening when they overload the air, and the ammonia of the shambles is more tolerable often than the aroma of an orange-grove. After riding for an hour through the gardens around Damascus, and breathing that hyper-intoxicating compound of all that is delicious in the scent of leaf and blossom, it is an unspeakable relief to snuff in the bazaars of the city the fragrance of new morocco, steaming "kibabs," and Persian "tumbac." South American travellers tell of trees whose breath upon the air is deadly after nightfall, and a notion of this sort has banished from some of our city streets a tree which a few years ago was a favorite. The Indian superstition of a tree possessed by the Devil has its illustration in the antipathy of almost every community to some noxious plant or flower.

The exhalations of trees are, however, much oftener salutary than noxious. There is real refreshment in the scent of the pine; its rich resinous flavor gives to the lungs a stimulus as real as Dr. Hunter's medicated vapors. What there is in the sunflower to purify the air, we believe that science has not yet explained. Yet this curious whim of the negroes in the South concerning it is not to be treated with disdain. The ornament of the slave's cabin door is his guardian of health, his good genius to forbid pestilence. An experiment recently tried by Lieutenant Maury seems to confirm this notion. The spot in Washington where the National Observatory stands is very subject to fever and ague. Last year Lieutenant Maury planted a bed of sunflowers forty-five feet broad, at a distance of two hundred yards from the buildings; and the result was, that, though in the neighborhood the fever was unusually prevalent, no one in the Observatory was attacked by it,—an exemption which had not been recorded before since the Observatory was built. This experiment does not, indeed, conclusively prove that the sunflower has an especial virtue. Perhaps any other plant of as rapid growth and a vegetation as luxuriant would have done the same good work

in devouring the malarious poisons given forth by the drying of the soil. Yet we may be sure, when the experiment is known, that the sunflower will be restored to favor, and through its prophylactic virtues perhaps regain its fame as the queen of the garden.

We have not space to discuss the agency of trees in sweetening and purifying the springs of water which run where their roots penetrate. The miracle of Moses at the bitter fountain of Marah is typical of the course which will restore, not merely the flow to wells which have become dry, but the sweetness to wells which have become hard and brackish. A city supplied with trees and parks, however flat and low its site, will not need expensive aqueducts to furnish it with water. It will be a long time before level Savannah will find it necessary to copy the water-works of Boston, — that town of twice triple hills. We have more faith in the sanative effects of Nature's decoctions beneath the surface, than in those healing beverages which render the name of "tea" so indefinite. Good water into which the virtue of plants hath passed is a more sovereign remedy for an inward bruise than any weak dilution of leaves and powders.

We pass abruptly from this engaging topic, to say a few words about birds in connection with trees. Where the forests are, there will the birds be found, certainly in this land. Insects everywhere abound, and no desert is so waste and sandy that it does not generate and nourish insect life. But birds congregate where they find shelter, food, and an appropriate home. When "the fig-tree putteth forth her green figs, and the vines with the tender grape give a good smell," then "the time of the singing of birds is come." We need not insist upon the essential service which small birds render in destroying insects, and so in saving vegetation, or upon their agency in directly enriching the soil. All the harm that they may do in depredations upon fruit is more than balanced by their music and by the animation which they impart to scenery. He is a public benefactor who can entice birds to the habitations of man; and it is good taste, if not good economy, that will plant fruit-trees for this purpose. Let the cherries go, if we can have the songs, and be rid of bugs into the bargain.

The actual damage which insects do to our orchards and grain-fields, even where birds are incessantly devouring them, is very considerable, as every farmer and every gardener knows to his sorrow. What it would be without this mitigation, no reckoning can tell. As the shoal which comes back where a single herring has spawned, so is the devouring host of worms which a single winged moth will leave as its progeny. The birds which devour the worms are by no means so useful, as Dr. Piper shows, as those which devour insects on the wing. And it is therefore no objection to swallows that they daintily prefer butterflies to caterpillars, and are more given to the noble chase of a flying prey than to the wearisome delving of slow clodhoppers.

We do not urge the practical consideration of easy and handy shooting, which led once a lazy sporting friend of ours to choose the neighborhood of a wood for his summer residence, so that he might, like a Pacha of the Lebanon, fire from his chamber window without removing his pipe or doffing his slippers, — since we hold this whole passion for small-bird shooting in utter abomination, as the basest form which sport can take. But for any passion to which birds must minister, it is needful to provide for them shelter and a home, — a place to hide and a place to build. Farmers and lovers alike must have their forest aviary, to exterminate borers or to indite sonnets of harmonious numbers, to rid the air of its plague of flies or to pen the sweet invocation, —

“ Come, all ye feathery people of mid air,
Beneath the chamber where my lady lies,
And, in your several musics, whisper love ! ”

A question of much interest, which we trust Dr. Piper will treat fully in some of his future numbers, is of the fitness of mingling fruit and forest trees. There are horticulturists who hold that the close-communion doctrine is the only one to be applied to orchards; that elms must be kept separate from plums as much as sinners from saints, and that an oak among apple-trees is as much an intruder as the serpent in Paradise. We are inclined to a different view, believing that the shade which large forest-trees give to an orchard and the moisture which they retain are very important to the healthy growth

of the fruit-bearing kinds. Some of the finest peach-trees we have ever known were nurtured beneath the shadow of a tall sycamore; and in walking along the edge of woods, we have often stopped to admire the sturdy limbs and luscious crop of some ancient apple-tree. Grapes ripen readily in the thick shade. On the continent of Europe it is quite common to find the orchards belted with rows of forest-trees, set there to break the force of the winds. And it may be safely predicted, that he who has his orchard protected by this means will gather a third more fruit than he who leaves the slender trees exposed. At present, in most of our orchards, the crop consists very largely of windfalls, which become food for swine, but not for men. It may answer for one who can afford it to use his peaches for the creation of pork, but that luxurious diet will prove in the end, we think, rather expensive.

Connected with this is another question, as to the advantage of mingling varieties of trees in forest planting. That picturesque effect is gained by this method there can be no doubt, as any one may see on the grounds of Mr. Tudor at Nahant. The more shades and shapes and contrasts it shows, the greater is the charm of a park, as well as of a garden. The inferior species of tree are dignified when set in the society of the monarchs of the grove, and draw honor from their privilege. The larch and the birch command more deference as courtiers of the majestic pine, than in any equal democracy of their own kind, however populous. The most ungainly trunk will have beauty in the forest, and he who will renew credit to those stunted cedars, which recall only by utter contrast the precious growth of ancient Lebanon, has but to plant them under the broad-leaved sycamore, or by the side of the symmetrical chestnut. Whether economy is well served by this mingling of many varieties, we are not so ready to say. Nature, indeed, mingles trees in the forests. Yet most forests have some prevailing species, which gives them their character. Oaks among the pines seem as alien as Greeks among the Jews, and a silver-leaved aspen, slender and tremulous, among the lithe and sinewy ash-trees, reminds us of a pale missionary preaching with fear and trembling to

a tribe of dusky Indians. The prevalent idea of planters is, we imagine, that the most profitable forests are homogeneous; that the growth is more rapid, and the influence upon the soil more wholesome. The French government, which has done more than any other in the culture of forests, rather favors this theory, and encourages the separation of kinds, where large returns are expected. In the Department of Landes it has chiefly replanted *pin*es; on the slopes of the Pyrenees the *box* is the favorite variety; while in Brittany and Normandy the *linden* abounds. In Scotland the *larch* has been most extensively cultivated, and more than ten thousand acres with more than fourteen million of trees were planted in less than a century by the single family of Athol. This example has been copied in other parts of Europe, and one is often surprised to find in secluded places, like the region of the Tegernsee in Southern Bavaria, beautiful artificial forests of larches. In Greece, the prepossession seems to have been for plane-trees, and on the hills of Laconia a recent traveller, M. About, has remarked the wanton and wasteful destruction of these noble monuments of the Turkish dominion.

The best method of planting, transplanting, pruning, thinning, and felling trees, is a subject which warns us back by its extent, and by the confusion of opinions which surrounds its discussion. We see no occasion to change the opinion expressed twenty-five years ago in this Review, that in most, if not in all cases, it is better to raise trees from the seed,—elm-trees and ash-trees no less than oak and hickory. We renew the protest, too, against the Procrustean truncation of saplings, which, to make the labor of removal a little easier, decorates for a lustrum our door-yards with a line of tufted poles. We would repeal, also, that tradition of arboricultural common law, which enjoins an annual use of the knife,—so much wood to be excised every year, so many feet of trunk to be gained; and particularly do we object to that “law of selection,” which destroys the vigor of the forest in decimating it. It is as bad for a forest to lose its great trees as for a nation to lose its great men,—the small trees and the small men alike assume meaner habits when they strive for the vacant places which the great have left.

For the successful culture of young trees, the first and almost the only necessity is that they be protected from the winds. The character of the soil is of less importance. The wind distorts and destroys them. They need most in the beginning that protection which they afterward effectually give. A close fence for a few years will secure the most tender fruit-trees on the very edge of an ocean cliff. Next to this, it is of importance that the soil about the roots be kept loose and porous, which a surface-covering of stones best accomplishes. Nine tenths of the trees which die after their transplanting, die because these essentials are neglected, not for any fault in the trees or in the soil. We should remark upon this point more at length, were we not advised that it will form a prominent topic in some future number of Dr. Piper's work.

All the topics which have been touched in this article will doubtless be fully discussed in the progress of the work we have noticed, and any novel opinions will be vouched for by abundant facts. One great fact is patent, and should of itself be enough to arouse the concern of all who are anxious about the future, that trees in this section of the country are disappearing far more rapidly than they are growing. The present annual demand for locomotive fuel alone in the United States is one hundred thousand acres, allowing (which is a large allowance) fifty cords to the acre; and yet this, large as it is, is but one among many items. Along the line of our older railways there are scarcely any woods remaining. If the rate of disappearance goes on for the next half-century as it has for the last, the child is now living who will see the soil of New England everywhere as bare as the soil of Attica, and its noble rivers shrunk in summer, like Achelöus and Cephissus, to shallow brooks. It is fashionable in many quarters to treat alarms of this kind as fantastic, and our tourists come back from a journey to Mount Katahdin or the Saguenay with the comforting conviction, that there is wood enough left in these Northern regions to supply the wants of America for a thousand years. We would rather trust to facts and figures than to these hopeful impressions. Cassandra here is a better guide than those who prophesy smooth things. The

increasing price of fuel is a premonition which we shall do well to heed. The probability of any important decrease in the consumption of wood no man can foresee. If the coal locomotives should prove economical, no doubt much less wood will be used for railway purposes, and iron may to some extent be substituted for wood in the construction of ships and houses. But on this we cannot build any calculation. The safer and more rational course is to meet the danger by the direct means of forest-planting. If half the money that is annually wasted in foolish speculations, or lost in the fluctuations of commerce, were turned to this work of renewing our forests, all the loss would be met by an equal gain. The pleadings of alarmists may seem extravagant, but in the end, we are confident, it will be proved that they were not too earnest or too early.

ART. VII. — *Archæology of the United States; or, Sketches, Historical and Bibliographical, of the Progress of Information and Opinion respecting Vestiges of Antiquity in the United States.* By SAMUEL F. HAVEN. Washington: Published by the Smithsonian Institution. New York: G. P. Putnam & Co. 1856. Large 4to. pp. 168.

MR. HAVEN condenses into the narrow compass of his essay the history of more than three centuries of learning and folly, speculation and reasoning, fancy and fact, as to the antiquities of this country. The condensation is severe, — the result of years of study in this precise field. It is, of course, impossible for us to attempt a further compression, which should exhibit to the reader even what the unhappy newspaper reporters call “a sketch” of the discourse of the man, even more unhappy, whose words they distort and caricature. The book is itself an ultimate analysis; it is not to be analyzed further. It is a bibliographical study of the books on American antiquities, and a philosophical history of the results of various investigators. The author is almost too careful not